```
LLL                 IIIIIIIII     BBBBBBBBBBBB     RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
LLL                 IIIIIIIII     BBBBBBBBBBBB     RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
LLL                 IIIIIIIII     BBBBBBBBBBBB     RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBBBBBBBBBBB     RRRRRRRRRRRR           TTT        LLL
LLL                    III        BBBBBBBBBBBB     RRRRRRRRRRRR           TTT        LLL
LLL                    III        BBBBBBBBBBBB     RRRRRRRRRRRR           TTT        LLL
LLL                    III        BBB         BBB  RRR   RRR              TTT        LLL
LLL                    III        BBB         BBB  RRR   RRR              TTT        LLL
LLL                    III        BBB         BBB  RRR   RRR              TTT        LLL
LLL                    III        BBB         BBB  RRR      RRR           TTT        LLL
LLL                    III        BBB         BBB  RRR      RRR           TTT        LLL
LLL                    III        BBB         BBB  RRR      RRR           TTT        LLL
LLLLLLLLLLLLLLL     IIIIIIIII     BBBBBBBBBBBB     RRR         RRR        TTT        LLLLLLLLLLLLLLL
LLLLLLLLLLLLLLL     IIIIIIIII     BBBBBBBBBBBB     RRR         RRR        TTT        LLLLLLLLLLLLLLL
LLLLLLLLLLLLLLL     IIIIIIIII     BBBBBBBBBBBB     RRR         RRR        TTT        LLLLLLLLLLLLLLL
```

```
**FILE**ID**STRCONCAT                                    M  2



  SSSSSSSS  TTTTTTTTTT  RRRRRRRR      CCCCCCCC     OOOOOO     NN      NN    CCCCCCCC    AAAAAA    TTTTTTTTTT
  SSSSSSSS  TTTTTTTTTT  RRRRRRRR      CCCCCCCC     OOOOOO     NN      NN    CCCCCCCC    AAAAAA    TTTTTTTTTT
SS              TT      RR      RR  CC            OO      OO  NN      NN  CC          AA      AA      TT
SS              TT      RR      RR  CC            OO      OO  NN      NN  CC          AA      AA      TT
SS              TT      RR      RR  CC            OO      OO  NNNN    NN  CC          AA      AA      TT
SS              TT      RR      RR  CC            OO      OO  NNNN    NN  CC          AA      AA      TT
  SSSSSS        TT      RRRRRRRR    CC            OO      OO  NN  NN  NN  CC          AA      AA      TT
  SSSSSS        TT      RRRRRRRR    CC            OO      OO  NN  NN  NN  CC          AA      AA      TT
        SS      TT      RR  RR      CC            OO      OO  NN    NNNN  CC          AAAAAAAAAA      TT
        SS      TT      RR  RR      CC            OO      OO  NN    NNNN  CC          AAAAAAAAAA      TT
        SS      TT      RR    RR    CC            OO      OO  NN      NN  CC          AA      AA      TT          ....
        SS      TT      RR    RR    CC            OO      OO  NN      NN  CC          AA      AA      TT          ....
SSSSSSSS        TT      RR      RR    CCCCCCCC     OOOOOO     NN      NN    CCCCCCCC  AA      AA      TT          ....
SSSSSSSS        TT      RR      RR    CCCCCCCC     OOOOOO     NN      NN    CCCCCCCC  AA      AA      TT          ....

LL              IIIIII      SSSSSSSS
LL              IIIIII      SSSSSSSS
LL                II      SS
LL                II      SS
LL                II      SS
LL                II      SS
LL                II        SSSSSS
LL                II        SSSSSS
LL                II              SS
LL                II              SS
LL                II              SS
LL                II              SS
LLLLLLLLLL      IIIIII    SSSSSSSS
LLLLLLLLLL      IIIIII    SSSSSSSS
```

STR
1-0

```
0 MODULE STR$CONCAT (                                ! Concatenate several strings
0
0                  IDENT = '1-017' ! File: STRCONCAT.B32   Edit: DG1017
0
0                    ) =
1 BEGIN
1 !
1 !****************************************************************************
1 !*                                                                          *
1 !*  COPYRIGHT (c) 1978, 1980, 1982, 1984 BY                                 *
1 !*  DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASSACHUSETTS.                  *
1 !*  ALL RIGHTS RESERVED.                                                    *
1 !*                                                                          *
1 !*  THIS SOFTWARE IS FURNISHED UNDER A LICENSE AND MAY BE USED AND COPIED   *
1 !*  ONLY IN  ACCORDANCE WITH  THE  TERMS  OF  SUCH  LICENSE  AND WITH THE   *
1 !*  INCLUSION OF THE ABOVE COPYRIGHT NOTICE. THIS SOFTWARE OR  ANY  OTHER   *
1 !*  COPIES THEREOF MAY NOT BE PROVIDED OR OTHERWISE MADE AVAILABLE TO ANY   *
1 !*  OTHER PERSON.  NO TITLE TO AND OWNERSHIP OF  THE  SOFTWARE IS  HEREBY   *
1 !*  TRANSFERRED.                                                            *
1 !*                                                                          *
1 !*  THE INFORMATION IN THIS SOFTWARE IS  SUBJECT TO CHANGE WITHOUT NOTICE   *
1 !*  AND  SHOULD  NOT  BE  CONSTRUED AS  A COMMITMENT BY DIGITAL EQUIPMENT   *
1 !*  CORPORATION.                                                            *
1 !*                                                                          *
1 !*  DIGITAL ASSUMES NO RESPONSIBILITY FOR THE USE  OR  RELIABILITY OF ITS   *
1 !*  SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.                 *
1 !*                                                                          *
1 !*                                                                          *
1 !****************************************************************************
1 !
1
1 !++
1 ! FACILITY: String support library
1 !
1 ! ABSTRACT:
1 !
1 !       This module takes up to 254 input strings and concatenates
1 !       them into a result string.  The strings can be of any supported
1 !       class and data type.
1 !
1 ! ENVIRONMENT: VAX-11 User mode
1 !
1 ! AUTHOR: R. Will, CREATION DATE: 12-Feb-79
1 !
1 ! MODIFIED BY:
1 !
1 ! R. Will, 12-Feb-79 : VERSION 01
1 !
1 ! 1-001 - Original.
1 ! 1-002 - Add multiple input strings (up to 254) to the CALL
1 !          entry point.  JBS 19-MAR-1979
1 ! 1-003 - Change facility name to STR.  JBS 19-MAR-1979
1 ! 1-004 - Make several corrections based on the code review.
1 !          JBS 09-APR-1979
1 ! 1-005 - Don't allow a concatenation to get longer than 65535 bytes,
1 !          the limit of string lengths in the VAX architecture.
1 !          JBS 09-APR-1979
```

```
1 ! 1-006 - Use the new STR error codes.  JBS 16-MAY-1979
1 ! 1-007 - Don't return truncate status unless the result length is less
1 !         than the sum of the lengths of the sources.  JBS 02-JUL-1979
1 ! 1-008 - Correct some typos in comments.  JBS 30-JUL-1979
1 ! 1-009 - Remove BAS$CONCAT, it gets its own module, since it must
1 !         signal.  JBS 18-OCT-1979
1 ! 1-010 - Add code for string interlock.  JBS 01-NOV-1979
1 ! 1-011 - Convert to using the string macros to doing interlocks.
1 !         JBS 06-NOV-1979
1 ! 1-012 - String speedup, called routines don't signal.  RW  10-Jan-1980
1 ! 1-013 - Extend to recognize additional classes of descriptors by
1 !         using $STR$GET_LEN_ADDR to extract length and address from
1 !         descriptors.  Remove string interlocking code.
1 !         RKR 15-APR-1981
1 ! 1-014 - Speed up code.  RKR 7-OCT-1981.
1 ! 1-015 - Use $STR$SIGNAL_FATAL instead of $STR$CHECK_STATUS.
1 !         RKR 18-NOV-1981.
1 ! 1-016 - Add support for class SO string descriptor.  DG 3-Oct-1983
1 ! 1-017 - Change class SO string descriptor to SB.  DG 27-Feb-1984
1 !--
1
1 !<BLF/PAGE>
```

```
;   81        0080  1 !
;   82        0081  1 ! SWITCHES:
;   83        0082  1 !
;   84        0083  1
;   85        0084  1 SWITCHES ADDRESSING_MODE
;   86        0085  1                 (EXTERNAL = GENERAL, NONEXTERNAL = WORD_RELATIVE);
;   87        0086  1
;   88        0087  1 !
;   89        0088  1 ! LINKAGES:
;   90        0089  1 !
;   91        0090  1
;   92        0091  1 REQUIRE 'RTLIN:STRLNK';          ! Use require file with string linkages
;   93        0276  1
;   94        0277  1 !
;   95        0278  1 ! TABLE OF CONTENTS:
;   96        0279  1 !
;   97        0280  1
;   98        0281  1 FORWARD ROUTINE
;   99        0282  1     STR$CONCAT;                  ! Concatenate two or more strings
;  100        0283  1
;  101        0284  1 !
;  102        0285  1 ! INCLUDE FILES:
;  103        0286  1 !
;  104        0287  1
;  105        0288  1 REQUIRE 'RTLIN:RTLPSECT';        ! Declare PSECTS code
;  106        0383  1
;  107        0384  1 REQUIRE 'RTLIN:STRMACROS';       ! use string macros to write code
;  108        1300  1
;  109        1301  1 LIBRARY 'RTLSTARLE';             ! STARLET library for macros and symbols
;  110        1302  1
;  111        1303  1 !
;  112        1304  1 ! MACROS: NONE
;  113        1305  1 !
;  114        1306  1 !
;  115        1307  1 ! EQUATED SYMBOLS:
;  116        1308  1 !
;  117        1309  1 !       NONE
;  118        1310  1 !
;  119        1311  1 ! PSECT DECLARATIONS
;  120        1312  1 !
;  121        1313  1
;  122        1314  1 DECLARE_PSECTS (STR);           ! Declare psects for STR$ facility
;  123        1315  1
;  124        1316  1 !
;  125        1317  1 ! OWN STORAGE:
;  126        1318  1 !
;  127        1319  1 !       NONE
;  128        1320  1 !
;  129        1321  1 ! EXTERNAL REFERENCES:
;  130        1322  1 !
;  131        1323  1
;  132        1324  1 EXTERNAL ROUTINE
;  133        1325  1     LIB$STOP;                                  ! Signal fatal errors
;  134        1326  1
;  135        1327  1 !+
;  136        1328  1 ! The following are the error messages used in this module:
;  137        1329  1 !-
;  138        1330  1
;  139        1331  1 EXTERNAL LITERAL
;  140        1332  1     STR$_NORMAL,                          ! Success
;  141        1333  1     STR$_STRIS_INT,                       ! String is interlocked
;  142        1334  1     STR$_ILLSTRCLA,                       ! Illegal string class
;  143        1335  1     STR$_TRU,                             ! Truncation
;  144        1336  1     STR$_FATINTERR,                       ! Fatal internal error
;  145        1337  1     STR$_STRTOOLON,                       ! String too long
;  146        1338  1     STR$_WRONUMARG;                       ! Wrong number of arguments
;  147        1339  1
```

```
1 GLOBAL ROUTINE STR$CONCAT (                    ! Concatenate strings
1
1         DEST_DESC                   ! pointer to destination descriptor
1
1                             ) =
1
1 !++
1 ! FUNCTIONAL DESCRIPTION
1 !
1 !       This routine takes up to 254 source strings of any supported
1 !       DTYPE and CLASS, concatenates them, and assigns that value to
1 !       the destination string.
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       DEST_DESC.wt.dx           Pointer to destination descriptor
1 !       [INPUT].rt.dx             Pointer to input string descriptor.
1 !                                 There can be up to 254 of these.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       NONE
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       NONE
1 !
1 ! COMPLETION CODES:
1 !
1 !       SS$_NORMAL       All of the characters in the input strings were
1 !                        copied into the destination string.
1 !       STR$_TRU         One or more input characters were not copied.
1 !                        This can only happen when the destination is a
1 !                        string having fixed-length semantics.
1 !
1 ! SIDE EFFECTS:
1 !
1 !       May allocate storage for the destination.
1 !       This routine signals if allocation fails (STR$_INSVIRMEM)
1 !       or a descriptor is bad (STR$_ILLSTRCLA).  An attempt to create a
1 !       dynamic string longer than 65535 bytes signals STR$_STRTOOLON,
1 !       STR$_FATINTERR if the debug switch is set in
1 !       STRMACROS and there is some internal corruption, and
1 !       STR$_WRONUMARG if there are not at least 2 arguments to this
1 !       routine.
1 !
1 !--
1
2     BEGIN
2
2     BUILTIN
2         ACTUALPARAMETER,
2         ACTUALCOUNT;
2
2     MAP
2         DEST_DESC : REF $STR$DESCRIPTOR;
2
```

```
:  206        1397  2        LITERAL
:  207        1398  2            MAX_SIZE        = 65535,         ! largest string we can handle
:  208        1399  2            FIRST_INPUT_ARG = 2;             ! Argument number of the first
:  209        1400  2                                             ! input
:  210        1401  2                                             ! string
:  211        1402  2
:  212        1403  2        LOCAL
:  213        1404  2            OUT_LEN,                   ! original length of destination string
:  214        1405  2            OUT_ADDR,                  ! address of 1st byte of original
:  215        1406  2                                       ! destination string
:  216        1407  2            RETURN_STATUS,             ! status from alloc and dealloc
:  217        1408  2            OVERLAP_FLAG,              ! =1 if input strings overlap dest
:  218        1409  2            TOTAL_LENGTH,              ! Sum of bytes in sources
:  219        1410  2            RESULT_LENGTH,             ! Number of bytes in destination
:  220        1411  2            RESULT_CLASS;              ! Descriptor class of destination
```

```
2 !+
2 ! This routine contains a great deal of repetitious code.  This is done
2 ! deliberately so that each class of destination string is handled
2 ! as efficiently as possible with a minimal amount of invocations of
2 ! common code.  As an overall guide to the following pages of code,
2 ! note the overall structure of the code, as indicated below.
2 !
2 !         -----
2 !         !
2 !         ! Loop to count up the total lengths of all the input strings
2 !         ! and to detect whether any of the inputs overlap with the
2 !         ! output area.  If overlaps exist, we must do concatenation
2 !         ! into a temporary area, then move temporary area to true
2 !         ! destination area.  If no overlap, copying directly into
2 !         ! destination area will occur.
2 !         !
2 !         -----
2 !
2 !         ----- CASE on class of output descriptor
2 !         !
2 !         ! -- Classes S, Z, A, NCA, SD and SB.  These classes have
2 !         !    fixed-length string semantics and are copied with
2 !         !    trailing padding if necessary.  Those that don't fit
2 !         !    return STR$_TRU
2 !         !
2 !         !      -----
2 !         !      !
2 !         !      ! Code for fixed-length semantic strings, where one or
2 !         !      ! more sources overlap destination string.
2 !         !      !
2 !         !      ! or
2 !         !      !
2 !         !      ! Code for fixed-length semantic strings, where there
2 !         !      ! is no overlap.
2 !         !      !
2 !         !      -----
2 !         !
2 !         ! -- Class D.  This class of descriptor has
2 !         !    dynamic-length string semantics and is copied with
2 !         !    no trailing padding.  Those that don't fit within 65K
2 !         !    signal STR$_TOOLON.
2 !         !
2 !         !      -----
2 !         !      !
2 !         !      ! Code for dynamic-length semantic strings, where one or
2 !         !      ! more sources overlap destination string.
2 !         !      !
2 !         !      ! or
2 !         !      !
2 !         !      ! Code for dynamic-length semantic strings, where there
2 !         !      ! is no overlap.
2 !         !      !
2 !         !      -----
2 !         !
2 !         ! -- Class VS.  This class of descriptor has
2 !         !    varying-length string semantics and is copied with
2 !         !    no trailing padding.  Those that don't fit within
```

```
2 !         |     DSC$W_MAXSTRLEN return STR$_TRU.
2 !         |
2 !         |         -----
2 !         |         |
2 !         |         | Code for varying-length semantic strings, where one or
2 !         |         | more sources overlap destination string.
2 !         |         |
2 !         |         | or
2 !         |         |
2 !         |         | Code for varying-length semantic strings, where there
2 !         |         | is no overlap.
2 !         |         |
2 !         |         -----
2 !         -----
```

```
2  !+
2  ! Check for a proper number of arguments and preset return status.
2  !-
2
3      IF (ACTUALCOUNT () LSS FIRST_INPUT_ARG)
2      THEN
3          BEGIN
3          !+
3          ! Build a local fixed-length descriptor pointing to name of this
3          ! routine and use it to signal STR$_WRONUMARG.
3          !-
3          LOCAL
3              ROUT_NAME_DESC : $STR$DESCRIPTOR;
3
3          ROUT_NAME_DESC [DSC$W_LENGTH] = 10 ;
3          ROUT_NAME_DESC [DSC$B_DTYPE] = DSC$K_DTYPE_T;
3          ROUT_NAME_DESC [DSC$B_CLASS] = DSC$K_CLASS_S;
3          ROUT_NAME_DESC [DSC$A_POINTER] = UPLIT (%ASCII'STR$CONCAT');
3          LIB$STOP (STR$_WRONUMARG, 2, ACTUALCOUNT (), ROUT_NAME_DESC);
2          END;
2
2      RETURN_STATUS = 1 ;          ! Assume success to follow
2
2  !+
2  ! Extract length and address of destination string.
2  !-
2      $STR$GET_LEN_ADDR (DEST_DESC, OUT_LEN, OUT_ADDR ) ;
2
2  !+
2  ! Check each source argument for overlapping the destination.
2  ! Note that the code below will sometimes decide we have overlap when
2  ! we do not: if the destination string is fixed-length and shorter
2  ! than the sum of the sources, we will reach beyond the end of the
2  ! destination string, and may run into a source string.  The consequent
2  ! decrease in speed (because of using a temporary descriptor needlessly)
2  ! is more than made up for by the improved speed of the scanning loop
2  ! below.
2  !-
2      OVERLAP_FLAG = 0;
2      TOTAL_LENGTH = 0;
2
2      !+
2      ! Now step through all the input descriptors
2      !-
2      INCR ARG_NO FROM FIRST_INPUT_ARG TO ACTUALCOUNT () DO
3          BEGIN
3
3          LOCAL
3              IN_LEN,                          ! length of Nth input string
3              IN_ADDR,                         ! addr of 1st byte of Nth string
3              SRC_DESC : REF $STR$DESCRIPTOR;      ! addr of Nth input
3                                                   ! string descriptor
3
3          SRC_DESC = ACTUALPARAMETER (.ARG_NO);    ! get Nth descr address
3
3          !+
3          ! Extract length and address of this input string.
```

```
3              !-
3              $STR$GET_LEN_ADDR (SRC_DESC, IN_LEN, IN_ADDR) ;
3
3              TOTAL_LENGTH = .TOTAL_LENGTH + .IN_LEN;
3
3              !+
3              ! If this string overlaps destination then set OVERLAP.
3              ! In either case, continue looping through all sources so that
3              ! we know total length involved.
3              !-
4              IF ($STR$OVERLAP ( .IN_ADDR, .IN_LEN, .OUT_ADDR, .TOTAL_LENGTH))
3              THEN
3                  OVERLAP_FLAG = 1;
3
2              END;               ! of total length of sources computation and
2                                 ! overlap detection
2      !+
2      ! The remainder of the algorithm is different for each class of output
2      ! string descriptor.
2      !-
2          RESULT_CLASS = .DEST_DESC [DSC$B_CLASS];     ! Class of output desc
2
2          CASE .RESULT_CLASS FROM DSC$K_CLASS_Z TO DSC$K_CLASS_SB OF
2              SET
2
```

```
   2                [DSC$K_CLASS_Z,                   ! Unspecific class (assume S)
   2                 DSC$K_CLASS_S,                   ! Fixed length string
   2                 DSC$K_CLASS_A,                   ! Array
   2                 DSC$K_CLASS_NCA,                 ! Non-contiguous array
   2                 DSC$K_CLASS_SD,                  ! Scaled decimal
   2                 DSC$K_CLASS_SB] :                ! String with bounds
   2    !+
   2    ! The destination string has fixed-length semantics.  Copy only as
   2    ! much of the sources into it as its length allows.  If its storage
   2    ! overlaps any of the source strings, do the concatenation into a
   2    ! temporary string and then copy back to the destination string.
   2    ! If sum of source lengths less than destination length, pad with
   2    ! fill character.
   2    !-
   3
   3                  BEGIN                          ! Class_S, _Z, _A, _NCA, _SD, _SB
   4                  IF (.OVERLAP_FLAG)
   3                  THEN
   4                      BEGIN
   4
   4                      LOCAL
   4                          CHR_PTR,              ! Variable pointer into output
   4                          TEMP_DESC : $STR$DESCRIPTOR;
   4
   4                      RETURN_STATUS =
P  4                          $STR$ALLOC_TMP (MIN (MAX_SIZE, .TOTAL_LENGTH),
   4                                          TEMP_DESC);
   4
   4                      !+
   4                      ! If allocate didn't work, don't continue the
   4                      ! concatenate
   4                      !-
   4
   4                      IF .RETURN_STATUS
   4                      THEN
   5                          BEGIN
   5                          CHR_PTR = .TEMP_DESC [DSC$A_POINTER]; ! init to
   5                                                                ! start of
   5                                                                ! temp output
   5
   5                          INCR ARG_NO FROM FIRST_INPUT_ARG TO ACTUALCOUNT() DO
   6                              BEGIN   ! copying loop
   6
   6                              LOCAL
   6                                  IN_LEN,      ! length of Nth input string
   6                                  IN_ADDR,     ! address of 1st byte of Nth
   6                                               ! input string
   6
   6                                  SRC_DESC : REF $STR$DESCRIPTOR;
   6
   6                              !+
   6                              ! Get Nth input descriptor address
   6                              !-
   6                              SRC_DESC = ACTUALPARAMETER (.ARG_NO);
   6
   6                              !+
   6                              ! Extract length and address of this input
```

```
6                       ! string.  There is no need to check status on
6                       ! these calls.  If there was anything
6                       ! wrong with the input descriptors, we would
6                       ! have signaled our way out of the loop where
6                       ! we added up the total lengths of the inputs.
6                       !-
6                       $STR$GET_LEN_ADDR (SRC_DESC, IN_LEN, IN_ADDR) ;
6
6                       CHR_PTR = CH$MOVE (.IN_LEN, .IN_ADDR, .CHR_PTR);
5                       END;    ! copying loop
5
5                   !+
5                   ! Now copy from the temporary descriptor to the real
5                   ! destination.  The destination may be shorter than
5                   ! TOTAL_LENGTH, in which case fewer characters will
5                   ! be copied than were concatenated, or it may be
5                   ! longer, in which case the destination will be
5                   ! padded with blanks.
5                   !-
5                   CH$COPY ( MIN (MAX_SIZE, .TOTAL_LENGTH),
5                             .TEMP_DESC [DSC$A_POINTER],
5                             STR$K_FILL_CHAR,
5                             .OUT_LEN,
5                             .OUT_ADDR);
5
5                   RETURN_STATUS = $STR$DEALOC_TMP (TEMP_DESC);
4                   END;        ! of concatenation and copy via temp
4
4                   !+
4                   ! Record actual size of constructed output string
4                   ! for later evaluation of what status to return.
4                   !-
4                   RESULT_LENGTH = .OUT_LEN ;
4               END             ! of overlap subcase
3           ELSE
4               BEGIN
4               !+
4               ! This is the case of a fixed-length destination which
4               ! does not overlap any of the sources.  We can copy
4               ! directly into the destination space.
4               !-
4
4               LOCAL
4                   CHR_PTR,
4                   CHARS_MOVED,
4                   ARG_NO;
4
4               CHR_PTR = .OUT_ADDR;    ! init to 1st byte of dest
4               CHARS_MOVED = 0;
4               ARG_NO = FIRST_INPUT_ARG;
4
4               WHILE (.CHARS_MOVED NEQ .OUT_LEN) DO
5                   BEGIN
5                   !+
5                   ! There is room for more characters in the
5                   ! destination string.  Copy as much of the next
```

```
5                  !  input string as will fit.
5                  !-
5
5                  LOCAL
5                      IN_LEN,         ! length of Nth input string
5                      IN_ADDR,        ! address of 1st byte of Nth
5                                      ! input string
5                      CHARS_LEFT;
5
5                  CHARS_LEFT = .OUT_LEN - .CHARS_MOVED;
5
6                  IF (.ARG_NO GTR ACTUALCOUNT ())
5                  THEN
6                      BEGIN
6                      !+
6                      ! We have exhausted the parameters, fill the
6                      ! remainder of the destination string with
6                      ! blanks.
6                      !-
6                      CH$FILL (STR$K_FILL_CHAR, .CHARS_LEFT, .CHR_PTR);
6                      CHARS_MOVED = .CHARS_MOVED + .CHARS_LEFT;
6                      END
6
5                  ELSE
5
6                      BEGIN           ! copy of one string
6                      !+
6                      ! We have another input string.  Copy it into
6                      ! the destination string, or as much of it as
6                      ! will fit.
6                      !-
6
6                      LOCAL
6                          SRC_DESC : REF $STR$DESCRIPTOR;
6
6                      SRC_DESC = ACTUALPARAMETER (.ARG_NO);
6                      !+
6                      ! Extract length and address of this input
6                      ! string.  There is no need to check status on
6                      ! these calls.  If there was anything
6                      ! wrong with the input descriptors, we would
6                      ! have signaled our way out of the loop where
6                      ! we added up the total lengths of the inputs.
6                      !-
6                      $STR$GET_LEN_ADDR (SRC_DESC, IN_LEN, IN_ADDR) ;
6
6                      CHR_PTR = CH$MOVE ( MIN (.IN_LEN, .CHARS_LEFT),
6                                          .IN_ADDR, .CHR_PTR);
6
6                      CHARS_MOVED = .CHARS_MOVED +
6                                          MIN (.IN_LEN, .CHARS_LEFT);
6
6                      ARG_NO = .ARG_NO + 1;
5                      END;            ! copy of one string
5
4                  END;                ! of WHILE loop
4
```

```
;  548        1736  4                     !+
;  549        1737  4                     ! Record the actual length of the output string
;  550        1738  4                     ! for later evaluation of the status to be returned.
;  551        1739  4                     !-
;  552        1740  4                     RESULT_LENGTH = .CHARS_MOVED ;
;  553        1741  4
;  554        1742  3                 END;                    ! of non-overlapped
;  555        1743  3                                         ! concatenation operation
;  556        1744  3
;  557        1745  2             END;                        ! of Class_S, _Z, _A, _NCA, _SD, _SB
```

```
        [DSC$K_CLASS_D] :
!+
! If we must reallocate the destination string (because the old string
! was not as long as the sum of the lengths of the source strings)
! or if the source strings overlap the destination string (which means
! that we are concatenating a substring of the result string, and
! therefore must not store into the destination string until we finish
! fetching all of the source strings) then we must use a temporary
! descriptor to hold the concatenation.  This is important for the
! reallocation case so that an AST will see, when looking at
! any particular character position of the string, either the old
! character or the new one.  The AST will never see, for example,
! an empty string into which we have not yet copied the first input
! string.
!-
            BEGIN

            IF (.OVERLAP_FLAG
                OR
                $STR$NEED_ALLOC ( MIN (MAX_SIZE, .TOTAL_LENGTH),
                                  $STR$DYN_AL_LEN (DEST_DESC))
                OR
                (.TOTAL_LENGTH GTR MAX_SIZE))
            THEN
                BEGIN

                LOCAL
                    TEMP_DESC : $STR$DESCRIPTOR,
                    CHR_PTR,
                    CHARS_MOVED,
                    CHARS_LEFT;

                !+
                ! Construct a dynamic string descriptor and try to
                ! allocate some space to it.
                !-
                TEMP_DESC [DSC$W_LENGTH] = 0;
                TEMP_DESC [DSC$B_DTYPE] = DEST_DESC [DSC$B_DTYPE] ;
                TEMP_DESC [DSC$B_CLASS] = DSC$K_CLASS_D ;
                TEMP_DESC [DSC$A_POINTER] = 0;
                RETURN_STATUS = $STR$ALLOCATE (
                                    MIN (MAX_SIZE, .TOTAL_LENGTH),
                                    TEMP_DESC);

                !+
                ! If the allocate did not succeed then don't proceed
                ! with concatenate.
                !-

                IF .RETURN_STATUS
                THEN
                    BEGIN
                    !+
                    ! Init pointer to output area to first byte
                    ! allocated to temp descriptor.
                    !-
                    CHR_PTR = .TEMP_DESC [DSC$A_POINTER] ;
```

```
;  5          CHARS_MOVED = 0;
;  5          CHARS_LEFT = MIN (MAX_SIZE, .TOTAL_LENGTH);
;  5
;  5          INCR ARG_NO FROM FIRST_INPUT_ARG TO ACTUALCOUNT() DO
;  6              BEGIN
;  6
;  6              LOCAL
;  6                  IN_LEN,         ! length of Nth input string
;  6                  IN_ADDR,        ! addr of 1st byte of Nth input
;  6                                  ! string
;  6                  SRC_DESC : REF $STR$DESCRIPTOR;
;  6
;  6              SRC_DESC = ACTUALPARAMETER (.ARG_NO);
;  6
;  6              !+
;  6              ! Extract length and address of this input
;  6              ! string.  There is no need to check status on
;  6              ! these calls.  If there was anything
;  6              ! wrong with the input descriptors, we would
;  6              ! have signaled our way out of the loop where
;  6              ! we added up the total lengths of the inputs.
;  6              !-
;  6              $STR$GET_LEN_ADDR (SRC_DESC, IN_LEN, IN_ADDR) ;
;  6
;  7              IF (.CHARS_LEFT GTR 0)
;  6              THEN
;  7                  BEGIN
;  7
;  7                  LOCAL
;  7                      LEN;
;  7
;  7                  LEN = MIN (.IN_LEN, .CHARS_LEFT);
;  7                  CHR_PTR = CH$MOVE (
;  7                                      .LEN, .IN_ADDR, .CHR_PTR);
;  7
;  7                  CHARS_MOVED = .CHARS_MOVED + LEN;
;  7                  CHARS_LEFT = .CHARS_LEFT - .LEN;
;  6                  END;
;  6
;  5              END;                ! concatenate into temp
;  5
;  5          !+
;  5          ! Now exchange our temporary descriptor with the
;  5          ! original destination descriptor, thus changing it
;  5          ! from pointing to its old string to pointing to
;  5          ! the concatenation.
;  5          !-
;  5          $STR$EXCH_DESCS (TEMP_DESC, DEST_DESC);
;  5
;  5          !+
;  5          ! Now free the space which was described by the
;  5          ! destination descriptor on entry to this routine,
;  5          ! since the caller no longer has access to it.
;  5          !-
;  5          RETURN_STATUS = $STR$DEALLOCATE (TEMP_DESC);
;  5
;  4          END;                    ! concatenate into temp and
```

```
4                                       ! exchange of temp and dest
4
4                END                    ! of overlapped subcase
4
3            ELSE
3
4                BEGIN
4                !+
4                ! There is no overlap and the destination does not need
4                ! to be reallocated.  We can use the more efficient
4                ! algorithm of concatenating directly into the
4                ! destination string.
4                !-
4
4                LOCAL
4                    CHR_PTR;
4
4                CHR_PTR = .DEST_DESC [DSC$A_POINTER];
4
4                INCR ARG_NO FROM FIRST_INPUT_ARG TO ACTUALCOUNT () DO
5                    BEGIN
5
5                    LOCAL
5                        IN_LEN,         ! length of Nth input string
5                        IN_ADDR,        ! addr of 1st byte of Nth input
5                                        ! string
5                        SRC_DESC : REF $STR$DESCRIPTOR;
5
5                    SRC_DESC = ACTUALPARAMETER (.ARG_NO);
5
5                    !+
5                    ! Extract length and address of this input
5                    ! string.  There is no need to check status on
5                    ! these calls.  If there was anything
5                    ! wrong with the input descriptors, we would
5                    ! have signaled our way out of the loop where
5                    ! we added up the total lengths of the inputs.
5                    !-
5                    $STR$GET_LEN_ADDR (SRC_DESC, IN_LEN, IN_ADDR) ;
5
5                    CHR_PTR = CH$MOVE ( .IN_LEN, .IN_ADDR, .CHR_PTR);
5
4                    END;        ! copy directly into destination
4
4                !+
4                ! The destination descriptor may (if it is a "short
4                ! string") have been longer than the sum of the source
4                ! lengths.  If so, shorten it.
4                !-
4                DEST_DESC [DSC$W_LENGTH]= MIN (MAX_SIZE, .TOTAL_LENGTH);
4
3                END;            ! of non-overlapped subcase
3
3                !+
3                ! Record length of output string constructed for later
3                ! evaluation of what status to return.
3                !-
```

```
;  730         1917  3                 RESULT_LENGTH = .DEST_DESC [DSC$W_LENGTH] ;
;  731         1918  3
;  732         1919  2             END;                    ! of Class_D
;     2         [DSC$K_CLASS_VS]:
;     2   !+
;     2   ! The destination string has varying-length string semantics.   Copy
;     2   ! only as much of the sources into it as its DSC$W_MAXSTRLEN length
;     2   ! allows.  If its storage overlaps any of the source strings, do the
;     2   ! concatenation into a temporary string and then copy back to the
;     2   ! destination string.
;     2   ! If sum of source lengths is less than or equal to DSC$W_MAXSTRLEN,
;     2   ! only its CURLEN field needs to be rewritten.  If sum of sources is
;     2   ! greater than DSC$W_MAXSTRLEN field, STR$_TRU is returned.
;     2   !-
;     2
;     3               BEGIN                           ! Class_VS
;     3
;     3               !+
;     3               ! Real length of a Class_VS destination is contained in
;     3               ! the MAXSTRLEN field.  Readjust our record of what can
;     3               ! be written into.
;     3               !-
;     3               OUT_LEN = .DEST_DESC [DSC$W_MAXSTRLEN] ;
;     3
;     4               IF (.OVERLAP_FLAG)
;     3               THEN
;     4                   BEGIN
;     4
;     4                   LOCAL
;     4                       CHR_PTR,            ! Variable pointer into output
;     4                       TEMP_DESC : $STR$DESCRIPTOR;
;     4
;     4                   RETURN_STATUS =
; P   4                       $STR$ALLOC_TMP (MIN (MAX_SIZE, .TOTAL_LENGTH),
;     4                                       TEMP_DESC);
;     4
;     4                   !+
;     4                   ! If allocate didn't work, don't continue the
;     4                   ! concatenate
;     4                   !-
;     4
;     4                   IF .RETURN_STATUS
;     4                   THEN
;     5                       BEGIN
;     5                       CHR_PTR = .TEMP_DESC [DSC$A_POINTER]; ! init to
;     5                                                             ! start of
;     5                                                             ! temp output
;     5
;     5                       INCR ARG_NO FROM FIRST_INPUT_ARG TO ACTUALCOUNT() DO
;     6                           BEGIN   ! INCR copying loop
;     6
;     6                           LOCAL
;     6                               IN_LEN,     ! length of Nth input string
;     6                               IN_ADDR,    ! address of 1st byte of Nth
;     6                                           ! input string
;     6
;     6                               SRC_DESC : REF $STR$DESCRIPTOR;
;     6
;     6                           !+
;     6                           ! Get Nth input descriptor address
```

```
6                       !-
6                       SRC_DESC = ACTUALPARAMETER (.ARG_NO);
6
6                       !+
6                       ! Extract length and address of this input
6                       ! string.  There is no need to check status on
6                       ! these calls.  If there was anything
6                       ! wrong with the input descriptors, we would
6                       ! have signaled our way out of the loop where
6                       ! we added up the total lengths of the inputs.
6                       !-
6                       $STR$GET_LEN_ADDR (SRC_DESC, IN_LEN, IN_ADDR) ;
6
6                       CHR_PTR = CH$MOVE (.IN_LEN, .IN_ADDR, .CHR_PTR);
5                       END;      ! INCR copying loop
5
5                   !+
5                   ! Now copy from the temporary descriptor to the real
5                   ! destination.  The destination may be shorter than
5                   ! TOTAL_LENGTH, in which case fewer characters will
5                   ! be copied than were concatenated.
5                   !-
5                   CH$MOVE ( MIN (.DEST_DESC [DSC$W_MAXSTRLEN],
5                                  .TOTAL_LENGTH),
5                             .TEMP_DESC [DSC$A_POINTER],
5                             .OUT_ADDR);
5
5                   RETURN_STATUS = $STR$DEALOC_TMP (TEMP_DESC);
5
4                   END;        ! of concatenation and copy via temp
4
4                   !+
4                   ! Record actual size of output string written for
4                   ! later evaluation of what status to return.
4                   !-
4                   RESULT_LENGTH = MIN ( .DEST_DESC [DSC$W_MAXSTRLEN],
4                                         .TOTAL_LENGTH) ;
4
4               END             ! of overlap subcase
3           ELSE
4
4               BEGIN
4               !+
4               ! This is the case of a varying_length string
4               ! destination which does not overlap any of the sources.
4               ! We can copy directly into the destination space.
4               !-
4
4               LOCAL
4                   CHR_PTR,
4                   CHARS_MOVED,
4                   ARG_NO;
4
4               CHR_PTR = .OUT_ADDR;    ! init to 1st byte of dest
4               CHARS_MOVED = 0;
4               ARG_NO = FIRST_INPUT_ARG;
```

```
	WHILE (.CHARS_MOVED NEQ .OUT_LEN) DO
	    BEGIN
	    !+
	    ! There is room for more characters in the
	    ! destination string.  Copy as much of the next
	    ! input string as will fit.
	    !-

	    LOCAL
		IN_LEN,			! length of Nth input string
		IN_ADDR,		! address of 1st byte of Nth
					! input string
		CHARS_LEFT;

	    CHARS_LEFT = .OUT_LEN - .CHARS_MOVED;

	    IF (.ARG_NO GTR ACTUALCOUNT ())
	    THEN
		BEGIN
		!+
		! We have exhausted the parameters, fill the
		! remainder of the destination string with
		! blanks.
		!-
		EXITLOOP ;
		END

	    ELSE

		BEGIN			! copy of one more string
		!+
		! We have another input string.  Copy it into
		! the destination string, or as much of it as
		! will fit.
		!-

		LOCAL
		    SRC_DESC : REF $STR$DESCRIPTOR;

		SRC_DESC = ACTUALPARAMETER (.ARG_NO);
		!+
		! Extract length and address of this input
		! string.  There is no need to check status on
		! these calls.  If there was anything
		! wrong with the input descriptors, we would
		! have signaled our way out of the loop where
		! we added up the total lengths of the inputs.
		!-
		$STR$GET_LEN_ADDR (SRC_DESC, IN_LEN, IN_ADDR) ;

		CHR_PTR = CH$MOVE ( MIN (.IN_LEN, .CHARS_LEFT),
				    .IN_ADDR, .CHR_PTR);

		CHARS_MOVED = .CHARS_MOVED +
					  MIN (.IN_LEN, .CHARS_LEFT);
```

```
;  905        2091  6                     ARG_NO = .ARG_NO + 1;
;  906        2092  5                     END;               ! copy of one more string
;  907        2093  5
;  908        2094  4                 END;                   ! of WHILE loop
;  909        2095  4
;  910        2096  4                 !+
;  911        2097  4                 ! Record actual length of output string written for
;  912        2098  4                 ! later evaluation of status to be returned.
;  913        2099  4                 !-
;  914        2100  4                 RESULT_LENGTH = .CHARS_MOVED ;
;  915        2101  4
;  916        2102  3             END;                       ! of non-overlapped
;  917        2103  3                                        ! concatenation operation
;  918        2104  3         !+
;  919        2105  3         ! Adjust CURLEN field to reflect the new size of the
;  920        2106  3         ! varying string.
;  921        2107  3         !-
;  922        2108  3         (.DEST_DESC [DSC$A_POINTER])<0,16> = .RESULT_LENGTH ;
;  923        2109  3
;  924        2110  2         END;                           ! of Class_VS
```

```
                [INRANGE, OUTRANGE] :
        !+
        ! The class of the destination string is unknown.  Will cause an error
        ! to be signaled.
        !-
                     RETURN_STATUS = STR$_ILLSTRCLA;

                TES;

        !+
        ! If any of the allocations or deallocations previously failed, or
        ! illegal string class was found then signal the error.
        !-
            $STR$SIGNAL_FATAL (RETURN_STATUS);  ! Signal fatal error

            IF .RESULT_CLASS EQL DSC$K_CLASS_D
            THEN
                BEGIN            ! special processing for dynamic semantics

                IF (.RESULT_LENGTH NEQ .TOTAL_LENGTH) THEN
                    LIB$STOP (STR$_STRTOOLON);

                RETURN (STR$_NORMAL);               ! used because bliss compiler
                                                    !  doesn't understand routines
                                                    !  that don't return

                END              ! special processing for dynamic semantics

            ELSE                 ! special processing for fixed and varying
                                 ! string semantics
                RETURN (IF (.RESULT_LENGTH GEQ .TOTAL_LENGTH)
                    THEN
                        SS$_NORMAL
                    ELSE
                        STR$_TRU  );

            END;                                    ! End of STR$CONCAT

                                                          .TITLE  STR$CONCAT
                                                          .IDENT  \1-017\

                                                          .PSECT  _STR$CODE,NOWRT,  SHR,  PIC,2

00  00  54  41  43  4E  4F  43  24  52  54  53  00000 P.AAA:  .ASCII  \STR$CONCAT\<0><0>                         ;

                                                          .EXTRN  LIB$STOP, STR$_NORMAL
                                                          .EXTRN  STR$_STRIS_INT, STR$_ILLSTRCLA
                                                          .EXTRN  STR$_TRU, STR$_FATINTERR
                                                          .EXTRN  STR$_STRTOOLON, STR$_WRONUMARG
                                                          .EXTRN  STR$ANALYZE_SDESC_R1
                                                          .EXTRN  STR$$INIT, STR$$V_INIT
                                                          .EXTRN  STR$$ALOC_SHORT
                                                          .EXTRN  STR$$Q_SHORT_Q, LIB$GET_VM
                                                          .EXTRN  STR$_INSVIRMEM, LIB$FREE_VM
                                                          .EXTRN  STR$$MOVQ_R1
```

```
                                       0FFC 00000        .ENTRY  STR$CONCAT, Save R2,R3,R4,R5,R6,R7,R8,R9,-   : 1340
                                                                 R10,R11
                   5E            28  C2 00002            SUBL2   #40, SP
                   02            6C  91 00005            CMPB    (AP), #2                                     : 1487
                                 22  1E 00008            BGEQU   1$
               20  AE  010E000A  8F  D0 0000A            MOVL    #17694730, ROUT_NAME_DESC                    : 1497
               24  AE        DF  AF  9E 00012            MOVAB   P.AAA, ROUT_NAME_DESC+4                      : 1500
                             20  AE  9F 00017            PUSHAB  ROUT_NAME_DESC                               : 1501
                   7E            6C  9A 0001A            MOVZBL  (AP), -(SP)
                                 02  DD 0001D            PUSHL   #2
                       00000000G 8F  DD 0001F            PUSHL   #STR$_WRONUMARG
        00000000G  00            04  FB 00025            CALLS   #4, LIB$STOP
               08  AE            01  D0 0002C 1$:        MOVL    #1, RETURN_STATUS                            : 1504
                   57        04  AC  D0 00030            MOVL    DEST_DESC, R7                                : 1509
                   02        03  A7  91 00034            CMPB    3(R7), #2
                                 0A  1A 00038            BGTRU   2$
               04  AE            67  3C 0003A            MOVZWL  (R7), OUT_LEN
                   6E        04  A7  D0 0003E            MOVL    4(R7), OUT_ADDR
                                 10  11 00042            BRB     3$
                   50            57  D0 00044 2$:        MOVL    R7, R0
                       00000000G 00  16 00047            JSB     STR$ANALYZE_SDESC_R1
               04  AE            50  D0 0004D            MOVL    R0, 4(SP)
                   6E            51  D0 00051            MOVL    R1, (SP)
                                 56  D4 00054 3$:        CLRL    TOTAL_LENGTH                                 : 1522
                   55            6C  9A 00056            MOVZBL  (AP), R5                                     : 1527
                   52            01  7D 00059            MOVQ    #1, ARG_NO                                   : 1550
                                 39  11 0005C            BRB     9$
                   50          6C42  D0 0005E 4$:        MOVL    (AP)[ARG_NO], SRC_DESC                       : 1536
                   02        03  A0  91 00062            CMPB    3(SRC_DESC), #2                              : 1541
                                 09  1A 00066            BGTRU   5$
                   54            60  3C 00068            MOVZWL  (SRC_DESC), IN_LEN
                   51        04  A0  D0 0006B            MOVL    4(SRC_DESC), IN_ADDR
                                 09  11 0006F            BRB     6$
                       00000000G 00  16 00071 5$:        JSB     STR$ANALYZE_SDESC_R1
                   54            50  D0 00077            MOVL    R0, R4
                   56            54  C0 0007A 6$:        ADDL2   IN_LEN, TOTAL_LENGTH                         : 1543
                   6E            51  D1 0007D            CMPL    IN_ADDR, OUT_ADDR                            : 1550
                                 09  1E 00080            BGEQU   7$
           50      51            54  C1 00082            ADDL3   IN_LEN, IN_ADDR, R0
                   50            6E  D1 00086            CMPL    OUT_ADDR, R0
                                 07  11 00089            BRB     8$
           50      6E            56  C1 0008B 7$:        ADDL3   TOTAL_LENGTH, OUT_ADDR, R0
                   50            51  D1 0008F            CMPL    IN_ADDR, R0
                                 03  18 00092 8$:        BGEQ    9$
                   53            01  D0 00094            MOVL    #1, OVERLAP_FLAG                             : 1552
           C3      52            55  F3 00097 9$:        AOBLEQ  R5, ARG_NO, 4$                               : 1527
               10  AE        03  A7  9A 0009B            MOVZBL  3(R7), RESULT_CLASS                          : 1560
           0F      00        10  AE  CF 000A0            CASEL   RESULT_CLASS, #0, #15                        : 1562
0020     01ED      002B      002B       000A5 10$:       .WORD   12$-10$,-
0020     0020      0020      002B       000AD                    12$-10$,-
0458     002B      002B      0020       000B5                    43$-10$,-
002B     0020      0020      0020       000BD                    11$-10$,-
                                                                 12$-10$,-
                                                                 11$-10$,-
                                                                 11$-10$,-
                                                                 11$-10$,-
                                                                 11$-10$,-
```

```
                                                              12$-10$,-
                                                              12$-10$,-
                                                              85$-10$,-
                                                              11$-10$,-
                                                              11$-10$,-
                                                              11$-10$,-
                                                              12$-10$
         08  AE 00000000G  8F  D0 000C5 11$:     MOVL    #STR$_ILLSTRCLA, RETURN_STATUS       2116
                       05E7    31 000CD          BRW     116$
             03            53  E8 000D0 12$:     BLBS    OVERLAP_FLAG, 13$                    1581
                       015B    31 000D3          BRW     35$
             07 00000000G  00  E8 000D6 13$:     BLBS    STR$$V_INIT, 14$                     1591
  00000000G  00            00  FB 000DD          CALLS   #0, STR$$INIT
             50 00000000G  8F  D0 000E4 14$:     MOVL    #STR$_NORMAL, RETURN_STATUS
             52            56  D0 000EB          MOVL    TOTAL_LENGTH, R2
  0000FFFF   8F            52  D1 000EE          CMPL    R2, #65535
             05            15     000F5          BLEQ    15$
             52      FFFF  8F  3C 000F7          MOVZWL  #65535, R2
  000000F0   8F            52  D1 000FC 15$:     CMPL    R2, #240
                           61  1A 00103          BGTRU   23$
                           52  D5 00105          TSTL    R2
                           04  12 00107          BNEQ    16$
                           53  D4 00109          CLRL    TEMP
                           3B  11 0010B          BRB     21$
             51        FF  A2  9E 0010D 16$:     MOVAB   -1(R2), R1
             51            07  8A 00111          BICB2   #7, R1
             54 00000000G0041  9E 00114          MOVAB   STR$$Q_SHORT_Q[R1], REMQUE_ADDR
             53        00  B4  0F 0011C 17$:     REMQUE  @0(REMQUE_ADDR), TEMP
                           05  1D 00120          BVS     18$
             52            01  D0 00122          MOVL    #1, ALLOC_DONE
                           19  11 00125          BRB     20$
                           52  04 00127 18$:     CLRL    ALLOC_DONE
                           56  DD 00129          PUSHL   TOTAL_LENGTH
  0000FFFF   8F            6E  D1 0012B          CMPL    (SP), #65535
                           05  15 00132          BLEQ    19$
             6E      FFFF  8F  3C 00134          MOVZWL  #65535, (SP)
  00000000G  00            01  FB 00139 19$:     CALLS   #1, STR$$ALOC_SHORT
             05            52  E8 00140 20$:     BLBS    ALLOC_DONE, 21$
             41            50  E9 00143          BLBC    RETURN_STATUS, 25$
             D4            11     00146          BRB     17$
             3C            50  E9 00148 21$:     BLBC    RETURN_STATUS, 25$
         24  AE            53  D0 0014B          MOVL    TEMP, TEMP_DESC+4
             51            56  D0 0014F          MOVL    TOTAL_LENGTH, R1
  0000FFFF   8F            51  D1 00152          CMPL    R1, #65535
                           05  15 00159          BLEQ    22$
             51      FFFF  8F  3C 0015B          MOVZWL  #65535, R1
         20  AE            51  B0 00160 22$:     MOVW    R1, TEMP_DESC
                           21  11 00164          BRB     25$
                       24  AE  9F 00166 23$:     PUSHAB  TEMP_DESC+4
         10  AE            52  D0 00169          MOVL    R2, 16(SP)
                       10  AE  9F 0016D          PUSHAB  16(SP)
  00000000G  00            02  FB 00170          CALLS   #2, LIB$GET_VM
             09            50  E8 00177          BLBS    RETURN_STATUS, 24$
             50 00000000G  8F  D0 0017A          MOVL    #STR$_INSVIRMEM, RETURN_STATUS
                           04  11 00181          BRB     25$
         20  AE            52  B0 00183 24$:     MOVW    R2, TEMP_DESC
         08  AE            50  D0 00187 25$:     MOVL    RETURN_STATUS, RETURN_STATUS
```

```
                             03      08   AE E8 0018B        BLBS   RETURN_STATUS, 26$                 ; 1598
                                        0099 31 0018F        BRW    34$                                ;
                             59      24   AE D0 00192 26$:   MOVL   TEMP_DESC+4, R9                    ; 1601
                             53           59 D0 00196        MOVL   R9, CHR_PTR                        ;
                             5A           6C 9A 00199        MOVZBL (AP), R10                          ; 1605
                             58           01 D0 0019C        MOVL   #1, ARG_NO                         ;
                                          20 11 0019F        BRB    30$                                ;
                             50         6C48 D0 001A1 27$:   MOVL   (AP)[ARG_NO], SRC_DESC             ; 1618
                             02      03   A0 91 001A5        CMPB   3(SRC_DESC), #2                    ; 1628
                                          09 1A 001A9        BGTRU  28$                                ;
                             52           60 3C 001AB        MOVZWL (SRC_DESC), IN_LEN                 ;
                             51      04   A0 D0 001AE        MOVL   4(SRC_DESC), IN_ADDR               ;
                                          09 11 001B2        BRB    29$                                ;
                                00000000G 00 16 001B4 28$:   JSB    STR$ANALYZE_SDESC_R1               ;
                             52           50 D0 001BA        MOVL   R0, R2                             ;
                 63          61           52 28 001BD 29$:   MOVC3  IN_LEN, (IN_ADDR), (CHR_PTR)       ; 1630
                 DC          58           5A F3 001C1 30$:   AOBLEQ R10, ARG_NO, 27$                   ; 1605
                             51           56 D0 001C5        MOVL   TOTAL_LENGTH, R1                   ; 1641
                   0000FFFF  8F           51 D1 001C8        CMPL   R1, #65535                         ;
                                          05 15 001CF        BLEQ   31$                                ;
                             51    FFFF   8F 3C 001D1        MOVZWL #65535, R1                         ;
04   AE          20          69           51 2C 001D6 31$:   MOVC5  R1, (R9), #32, OUT_LEN, @OUT_ADDR  ; 1645
                                     00   BE    001DC                                                  ;
                             50 00000000G 8F D0 001DE        MOVL   #STR$_NORMAL, RETURN_STATUS        ; 1647
                                          59 D5 001E5        TSTL   R9                                 ;
                                          3E 13 001E7        BEQL   33$                                ;
                       00F0  8F      20   AE B1 001E9        CMPW   TEMP_DESC, #240                    ;
                                          1A 1A 001EF        BGTRU  32$                                ;
                             51           59 D0 001F1        MOVL   R9, STRING_BLOCK                   ;
                             51      FE   A1 3C 001F4        MOVZWL -2(STRING_BLOCK), ALLOC_LENGTH     ;
                                          51 D7 001F8        DECL   R1                                 ;
                             51           07 8A 001FA        BICB2  #7, R1                             ;
                             51 00000000G0041 9E 001FD       MOVAB  STR$$Q_SHORT_Q[R1], INSQUE_ADDR    ;
                         00  B1           69 0E 00205        INSQUE (R9), @0(INSQUE_ADDR)              ;
                                          1C 11 00209        BRB    33$                                ;
                                     24   AE 9F 0020B 32$:   PUSHAB TEMP_DESC+4                        ;
                         10  AE      24   AE 3C 0020E        MOVZWL TEMP_DESC, 16(SP)                  ;
                                     10   AE 9F 00213        PUSHAB 16(SP)                             ;
                   00000000G 00           02 FB 00216        CALLS  #2, LIB$FREE_VM                    ;
                             07           50 E8 0021D        BLBS   RETURN_STATUS, 33$                 ;
                             50 00000000G 8F D0 00220        MOVL   #STR$_FATINTERR, RETURN_STATUS     ;
                         08  AE           50 D0 00227 33$:   MOVL   RETURN_STATUS, RETURN_STATUS       ;
                             5A      04   AE D0 0022B 34$:   MOVL   OUT_LEN, RESULT_LENGTH             ; 1654
                                          5E 11 0022F        BRB    42$                                ; 1581
                         0C  AE           6E D0 00231 35$:   MOVL   OUT_ADDR, CHR_PTR                  ; 1670
                                          5B D4 00235        CLRL   CHARS_MOVED                        ; 1671
                             58           02 D0 00237        MOVL   #2, ARG_NO                         ; 1672
                         04  AE           5B D1 0023A 36$:   CMPL   CHARS_MOVED, OUT_LEN               ; 1674
                                          4C 13 0023E        BEQL   41$                                ;
                 5A      04  AE           5B C3 00240        SUBL3  CHARS_MOVED, OUT_LEN, CHARS_LEFT   ; 1688
     5B          6C          08           00 ED 00245        CMPZV  #0, #8, (AP), ARG_NO               ; 1690
                                          0C 18 0024A        BGEQ   37$                                ;
     5A          20          6E           00 2C 0024C        MOVC5  #0, (SP), #32, CHARS_LEFT, @CHR_PTR ; 1698
                                     0C   BE    00251                                                  ;
                             5B           5A C0 00253        ADDL2  CHARS_LEFT, CHARS_MOVED            ; 1699
                                          E2 11 00256        BRB    36$                                ; 1690
                             50         6C48 D0 00258 37$:   MOVL   (AP)[ARG_NO], SRC_DESC             ; 1714
```

```
                          02        03  A0 91 0025C          CMPB    3(SRC_DESC), #2                      : 1723
                                        09 1A 00260          BGTRU   38$                                  :
                          59            60 3C 00262          MOVZWL  (SRC_DESC), IN_LEN                   :
                          51        04  A0 D0 00265          MOVL    4(SRC_DESC), IN_ADDR                 :
                                        09 11 00269          BRB     39$                                  :
                             00000000G  00 16 0026B 38$:     JSB     STR$ANALYZE_SDESC_R1                 :
                          59            50 D0 00271          MOVL    R0, R9                               :
                          5A            59 D1 00274 39$:     CMPL    R9, CHARS_LEFT                       : 1725
                                        03 15 00277          BLEQ    40$                                  :
                          59            5A D0 00279          MOVL    CHARS_LEFT, R9                       :
     0C   BE              61            59 28 0027C 40$:     MOVC3   R9, (IN_ADDR), @CHR_PTR              : 1726
                    0C    AE            53 D0 00281          MOVL    R3, CHR_PTR                          :
                          5B            59 C0 00285          ADDL2   R9, CHARS_MOVED                      : 1729
                                        58 D6 00288          INCL    ARG_NO                               : 1731
                                        AE 11 0028A          BRB     36$                                  : 1674
                          5A            5B D0 0028C 41$:     MOVL    CHARS_MOVED, RESULT_LENGTH           : 1740
                                  0425  31 0028F 42$:        BRW     116$                                 : 1562
                          5B            56 D0 00292 43$:     MOVL    TOTAL_LENGTH, R11                    : 1788
              0000FFFF    8F            5B D1 00295          CMPL    R11, #65535                          :
                                        05 15 0029C          BLEQ    44$                                  :
                          5B      FFFF  8F 3C 0029E          MOVZWL  #65535, R11                          :
                          5C            53 E8 002A3 44$:     BLBS    OVERLAP_FLAG, 52$                    : 1763
                          51            56 D0 002A6          MOVL    TOTAL_LENGTH, R1                     : 1766
              0000FFFF    8F            51 D1 002A9          CMPL    R1, #65535                           :
                                        05 15 002B0          BLEQ    45$                                  :
                          51      FFFF  8F 3C 002B2          MOVZWL  #65535, R1                           :
                          52        04  A7 D0 002B7 45$:     MOVL    4(R7), R2                            :
                                        53 D4 002BB          CLRL    R3                                   :
                                        52 D5 002BD          TSTL    R2                                   :
                                        06 12 002BF          BNEQ    46$                                  :
                                        53 D6 002C1          INCL    R3                                   :
                                        50 D4 002C3          CLRL    R0                                   :
                                        13 11 002C5          BRB     48$                                  :
                  00F0    8F            67 B1 002C7 46$:     CMPW    (R7), #240                           :
                                        05 1B 002CC          BLEQU   47$                                  :
                          50            67 3C 002CE          MOVZWL  (R7), R0                             :
                                        07 11 002D1          BRB     48$                                  :
                          50            52 D0 002D3 47$:     MOVL    R2, STRING_BLOCK                     :
                          50        FE  A0 3C 002D6          MOVZWL  -2(STRING_BLOCK), R0                 :
              000000F0    8F            50 D1 002DA 48$:     CMPL    R0, #240                             :
                                        21 1F 002E1          BLSSU   53$                                  :
                          04            53 E9 002E3          BLBC    R3, 49$                              :
                                        50 D4 002E6          CLRL    R0                                   :
                                        13 11 002E8          BRB     51$                                  :
                  00F0    8F            67 B1 002EA 49$:     CMPW    (R7), #240                           :
                                        05 1B 002EF          BLEQU   50$                                  :
                          50            67 3C 002F1          MOVZWL  (R7), R0                             :
                                        07 11 002F4          BRB     51$                                  :
                          50            52 D0 002F6 50$:     MOVL    R2, STRING_BLOCK                     :
                          50        FE  A0 3C 002F9          MOVZWL  -2(STRING_BLOCK), R0                 :
                          50            51 D1 002FD 51$:     CMPL    R1, R0                               :
                                        21 13 00300          BEQL    57$                                  :
                                        2B 11 00302 52$:     BRB     58$                                  :
                          04            53 E9 00304 53$:     BLBC    R3, 54$                              :
                                        50 D4 00307          CLRL    R0                                   :
                                        13 11 00309          BRB     56$                                  :
                  00F0    8F            67 B1 0030B 54$:     CMPW    (R7), #240                           :
```

```
                                        05  1B 00310        BLEQU   55$                                       ;
                    50                  67  3C 00312        MOVZWL  (R7), R0                                  ;
                                        07  11 00315        BRB     56$                                       ;
                    50                  52  D0 00317 55$:   MOVL    R2, STRING_BLOCK                          ;
                    50            FE    A0  3C 0031A        MOVZWL  -2(STRING_BLOCK), R0                      ;
                    50                  51  D1 0031E 56$:   CMPL    R1, R0                                    ;
                                        0C  1A 00321        BGTRU   58$                                       ;
          0000FFFF  8F                  56  D1 00323 57$:   CMPL    TOTAL_LENGTH, #65535                      ; 1768
                                        03  14 0032A        BGTR    58$                                       ;
                                      0194  31 0032C        BRW     79$                                       ;
                                  20    AE  B4 0032F 58$:   CLRW    TEMP_DESC                                 ; 1782
  22   AE           57                  02  81 00332        ADDB3   #2, R7, TEMP_DESC+2                       ; 1783
                23  AE                  02  90 00337        MOVB    #2, TEMP_DESC+3                           ; 1784
                                  24    AE  D4 0033B        CLRL    TEMP_DESC+4                               ; 1785
                    07 00000000G        00  E8 0033E        BLBS    STR$$V_INIT, 59$                          ; 1788
         00000000G  00                  00  FB 00345        CALLS   #0, STR$$INIT                             ;
                    50 00000000G        8F  D0 0034C 59$:   MOVL    #STR$_NORMAL, RETURN_STATUS               ;
          000000F0  8F                  5B  D1 00353        CMPL    R11, #240                                 ;
                                        61  1A 0035A        BGTRU   67$                                       ;
                                        5B  D5 0035C        TSTL    R11                                       ;
                                        04  12 0035E        BNEQ    60$                                       ;
                                        53  D4 00360        CLRL    TEMP                                      ;
                                        3B  11 00362        BRB     65$                                       ;
                    51            FF    AB  9E 00364 60$:   MOVAB   -1(R11), R1                               ;
                    51                  07  8A 00368        BICB2   #7, R1                                    ;
                    54 00000000G0041        9E 0036B        MOVAB   STR$$Q_SHORT_Q[R1], REMQUE_ADDR           ;
                    53            00    B4  0F 00373 61$:   REMQUE  @0(REMQUE_ADDR), TEMP                     ;
                                        05  1D 00377        BVS     62$                                       ;
                    52                  01  D0 00379        MOVL    #1, ALLOC_DONE                            ;
                                        19  11 0037C        BRB     64$                                       ;
                                        52  D4 0037E 62$:   CLRL    ALLOC_DONE                                ;
                                        56  DD 00380        PUSHL   TOTAL_LENGTH                              ;
          0000FFFF  8F                  6E  D1 00382        CMPL    (SP), #65535                              ;
                                        05  15 00389        BLEQ    63$                                       ;
                    6E          FFFF    8F  3C 0038B        MOVZWL  #65535, (SP)                              ;
         00000000G  00                  01  FB 00390 63$:   CALLS   #1, STR$$ALOC_SHORT                       ;
                    05                  52  E8 00397 64$:   BLBS    ALLOC_DONE, 65$                           ;
                    41                  50  E9 0039A        BLBC    RETURN_STATUS, 69$                        ;
                                        D4  11 0039D        BRB     61$                                       ;
                    3C                  50  E9 0039F 65$:   BLBC    RETURN_STATUS, 69$                        ;
                24  AE                  53  D0 003A2        MOVL    TEMP, TEMP_DESC+4                         ;
                    51                  56  D0 003A6        MOVL    TOTAL_LENGTH, R1                          ;
          0000FFFF  8F                  51  D1 003A9        CMPL    R1, #65535                                ;
                                        05  15 003B0        BLEQ    66$                                       ;
                    51          FFFF    8F  3C 003B2        MOVZWL  #65535, R1                                ;
                20  AE                  51  B0 003B7 66$:   MOVW    R1, TEMP_DESC                             ;
                                        21  11 003BB        BRB     69$                                       ;
                                  24    AE  9F 003BD 67$:   PUSHAB  TEMP_DESC+4                               ;
                10  AE                  5B  D0 003C0        MOVL    R11, 16(SP)                               ;
                                  10    AE  9F 003C4        PUSHAB  16(SP)                                    ;
         00000000G  00                  02  FB 003C7        CALLS   #2, LIB$GET_VM                            ;
                    09                  50  E8 003CE        BLBS    RETURN_STATUS, 68$                        ;
                    50 00000000G        8F  D0 003D1        MOVL    #STR$_INSVIRMEM, RETURN_STATUS            ;
                                        04  11 003D8        BRB     69$                                       ;
                20  AE                  5B  B0 003DA 68$:   MOVW    R11, TEMP_DESC                            ;
                08  AE                  50  D0 003DE 69$:   MOVL    RETURN_STATUS, RETURN_STATUS              ;
                    03            08    AE  E8 003E2        BLBS    RETURN_STATUS, 70$                        ; 1795
```

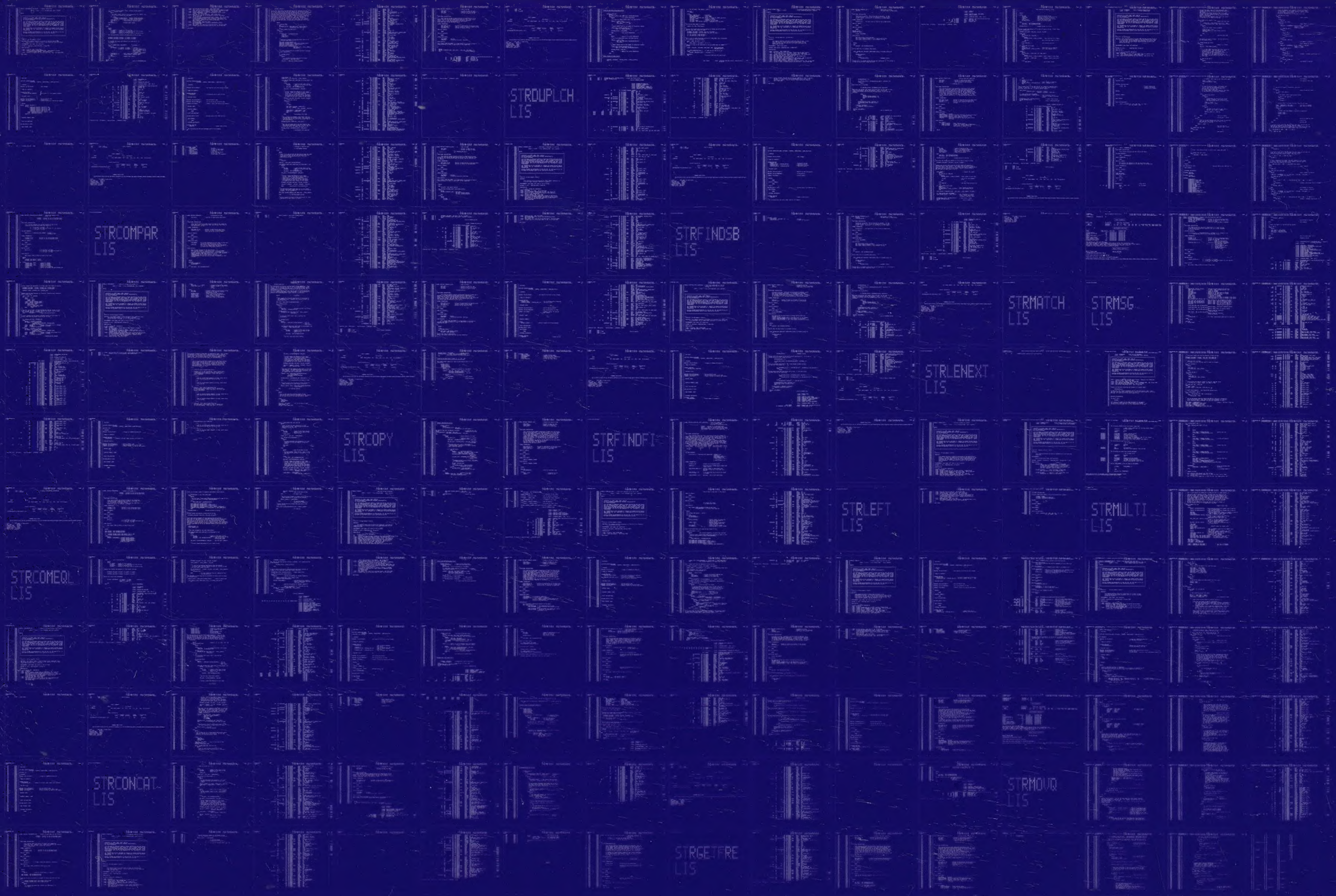
```
STR$CONCAT                                                        C 5
1-017                                                   16-Sep-1984 01:33:32    VAX-11 Bliss-32 V4.0-742          Page  29
                                                        14-Sep-1984 12:40:02    [LIBRTL.SRC]STRCONCAT.B32;1             (9)

                                          010D  31 003E6          BRW      84$                                      ;
                         53         24      AE  D0 003E9 70$:     MOVL     TEMP_DESC+4, CHR_PTR                     ; 1802
                                            5B  D4 003ED          CLRL     CHARS_MOVED                              ; 1803
                         51                 56  D0 003EF          MOVL     TOTAL_LENGTH, R1                         ; 1804
              0000FFFF   8F                 51  D1 003F2          CMPL     R1, #65535                               ;
                                            05  15 003F9          BLEQ     71$                                      ;
                         51       FFFF      8F  3C 003FB          MOVZWL   #65535, R1                               ;
                         58                 51  D0 00400 71$:     MOVL     R1, CHARS_LEFT                           ;
                         57                 6C  9A 00403          MOVZBL   (AP), R7                                 ; 1806
                         59                 01  D0 00406          MOVL     #1, ARG_NO                               ;
                                            3D  11 00409          BRB      76$                                      ;
                         50               6C49  D0 0040B 72$:     MOVL     (AP)[ARG_NO], SRC_DESC                   ; 1815
                         02         03      A0  91 0040F          CMPB     3(SRC_DESC), #2                          ; 1825
                                            09  1A 00413          BGTRU    73$                                      ;
                         52                 60  3C 00415          MOVZWL   (SRC_DESC), IN_LEN                       ;
                         51         04      A0  D0 00418          MOVL     4(SRC_DESC), IN_ADDR                     ;
                                            09  11 0041C          BRB      74$                                      ;
                            00000000G       00  16 0041E 73$:     JSB      STR$ANALYZE_SDESC_R1                     ;
                         52                 50  D0 00424          MOVL     R0, R2                                   ;
                                            58  D5 00427 74$:     TSTL     CHARS_LEFT                               ; 1827
                                            1D  15 00429          BLEQ     76$                                      ;
                         50                 52  D0 0042B          MOVL     IN_LEN, R0                               ; 1834
                         58                 50  D1 0042E          CMPL     R0, CHARS_LEFT                           ;
                                            03  15 00431          BLEQ     75$                                      ;
                         50                 58  D0 00433          MOVL     CHARS_LEFT, R0                           ;
                   14    AE                 50  D0 00436 75$:     MOVL     R0, LEN                                  ;
         63              61         14      AE  28 0043A          MOVC3    LEN, (IN_ADDR), (CHR_PTR)                ; 1836
                         5B         14    AE4B  9E 0043F          MOVAB    LEN[CHARS_MOVED], CHARS_MOVED            ; 1838
                         58         14      AE  C2 00444          SUBL2    LEN, CHARS_LEFT                          ; 1839
         BF              59                 57  F3 00448 76$:     AOBLEQ   R7, ARG_NO, 72$                          ; 1806
                         51         04      AC  D0 0044C          MOVL     DEST_DESC, R1                            ; 1850
                   18    AE                 61  B0 00450          MOVW     (R1), $STR$TEMP_DESC                     ;
                   1C    AE         04      A1  D0 00454          MOVL     4(R1), $STR$TEMP_DESC+4                  ;
                   22    AE         02      A1  B0 00459          MOVW     2(R1), TEMP_DESC+2                       ;
                         50         20      AE  9E 0045E          MOVAB    TEMP_DESC, R0                            ;
                            00000000G       00  16 00462          JSB      STR$$MOVQ_R1                             ;
                   20    AE         18      AE  B0 00468          MOVW     $STR$TEMP_DESC, TEMP_DESC                ;
                   24    AE         1C      AE  D0 0046D          MOVL     $STR$TEMP_DESC+4, TEMP_DESC+4            ;
                         50  00000000G      8F  D0 00472          MOVL     #STR$_NORMAL, RETURN_STATUS              ; 1857
                         52         24      AE  D0 00479          MOVL     TEMP_DESC+4, R2                          ;
                                            3E  13 0047D          BEQL     78$                                      ;
                 00F0    8F         20      AE  B1 0047F          CMPW     TEMP_DESC, #240                          ;
                                            1A  1A 00485          BGTRU    77$                                      ;
                         51                 52  D0 00487          MOVL     R2, STRING_BLOCK                         ;
                         51         FE      A1  3C 0048A          MOVZWL   -2(STRING_BLOCK), ALLOC_LENGTH           ;
                                            51  D7 0048E          DECL     R1                                       ;
                         51                 07  8A 00490          BICB2    #7, R1                                   ;
                         51  00000000G0041      9E 00493          MOVAB    STR$$Q_SHORT_Q[R1], INSQUE_ADDR          ;
                   00    B1                 62  0E 0049B          INSQUE   (R2), @0(INSQUE_ADDR)                    ;
                                            1C  11 0049F          BRB      78$                                      ;
                                    24      AE  9F 004A1 77$:     PUSHAB   TEMP_DESC+4                              ;
                   10    AE         24      AE  3C 004A4          MOVZWL   TEMP_DESC, 16(SP)                        ;
                                    10      AE  9F 004A9          PUSHAB   16(SP)                                   ;
             00000000G   00                 02  FB 004AC          CALLS    #2, LIB$FREE_VM                          ;
                         07                 50  E8 004B3          BLBS     RETURN_STATUS, 78$                       ;
                         50  00000000G      8F  D0 004B6          MOVL     #STR$_FATINTERR, RETURN_STATUS           ;
                   08    AE                 50  D0 004BD 78$:     MOVL     RETURN_STATUS, RETURN_STATUS             ;
```

```
                                        33   11 004C1        BRB      84$                                            ; 1763
                        53        04    A7   D0 004C3 79$:   MOVL     4(R7), CHR_PTR                                 ; 1877
                        59              6C   9A 004C7        MOVZBL   (AP), R9                                       ; 1879
                        58              01   D0 004CA        MOVL     #1, ARG_NO
                                        20   11 004CD        BRB      83$
                        50            6C48   D0 004CF 80$:   MOVL     (AP)[ARG_NO], SRC_DESC                         ; 1888
                        02        03    A0   91 004D3        CMPB     3(SRC_DESC), #2                                ; 1898
                                        09   1A 004D7        BGTRU    81$
                        52              60   3C 004D9        MOVZWL   (SRC_DESC), IN_LEN
                        51        04    A0   D0 004DC        MOVL     4(SRC_DESC), IN_ADDR
                                        09   11 004E0        BRB      82$
                           00000000G    00   16 004E2 81$:   JSB      STR$ANALYZE_SDESC_R1
                        52              50   D0 004E8        MOVL     R0, R2
          63            61              52   28 004EB 82$:   MOVC3    IN_LEN, (IN_ADDR), (CHR_PTR)                   ; 1900
          DC            58              59   F3 004EF 83$:   AOBLEQ   R9, ARG_NO, 80$                                ; 1879
                        67              5B   B0 004F3        MOVW     R11, (R7)                                      ; 1909
                        5A        04    BC   3C 004F6 84$:   MOVZWL   @DEST_DESC, RESULT_LENGTH                      ; 1917
                                      01BA   31 004FA        BRW      116$                                           ; 1562
                 04     AE              67   3C 004FD 85$:   MOVZWL   (R7), OUT_LEN                                  ; 1939
                        03              53   E8 00501        BLBS     OVERLAP_FLAG, 86$                              ; 1941
                                      015E   31 00504        BRW      109$
                        07 00000000G    00   E8 00507 86$:   BLBS     STR$$V_INIT, 87$                               ; 1951
          00000000G     00              00   FB 0050E        CALLS    #0, STR$$INIT
                        50 00000000G    8F   D0 00515 87$:   MOVL     #STR$_NORMAL, RETURN_STATUS
                        52              56   D0 0051C        MOVL     TOTAL_LENGTH, R2
          0000FFFF      8F              52   D1 0051F        CMPL     R2, #65535
                                        05   15 00526        BLEQ     88$
                        52      FFFF    8F   3C 00528        MOVZWL   #65535, R2
          000000F0      8F              52   D1 0052D 88$:   CMPL     R2, #240
                                        61   1A 00534        BGTRU    96$
                                        52   D5 00536        TSTL     R2
                                        04   12 00538        BNEQ     89$
                                        53   D4 0053A        CLRL     TEMP
                                        3B   11 0053C        BRB      94$
                        51        FF    A2   9E 0053E 89$:   MOVAB    -1(R2), R1
                        51              07   8A 00542        BICB2    #7, R1
                        54 00000000G0041     9E 00545        MOVAB    STR$$Q_SHORT_Q[R1], REMQUE_ADDR
                        53        00    B4   0F 0054D 90$:   REMQUE   @0(REMQUE_ADDR), TEMP
                                        05   1D 00551        BVS      91$
                        52              01   D0 00553        MOVL     #1, ALLOC_DONE
                                        19   11 00556        BRB      93$
                                        52   D4 00558 91$:   CLRL     ALLOC_DONE
                                        56   7D 0055A        PUSHL    TOTAL_LENGTH
          0000FFFF      8F              6E   D1 0055C        CMPL     (SP), #65535
                                        05   15 00563        BLEQ     92$
                        6E      FFFF    8F   3C 00565        MOVZWL   #65535, (SP)
          00000000G     00              01   FB 0056A 92$:   CALLS    #1, STR$$ALOC_SHORT
                        05              52   E8 00571 93$:   BLBS     ALLOC_DONE, 94$
                        41              50   E9 00574        BLBC     RETURN_STATUS, 98$
                                        D4   11 00577        BRB      90$
                        3C              50   E9 00579 94$:   BLBC     RETURN_STATUS, 98$
                 24     AE              53   D0 0057C        MOVL     TEMP, TEMP_DESC+4
                        51              56   D0 00580        MOVL     TOTAL_LENGTH, R1
          0000FFFF      8F              51   D1 00583        CMPL     R1, #65535
                                        05   15 0058A        BLEQ     95$
                        51      FFFF    8F   3C 0058C        MOVZWL   #65535, R1
                 20     AE              51   B0 00591 95$:   MOVW     R1, TEMP_DESC
```

```
                                 21   11 00595         BRB      98$
                         24      AE   9F 00597 96$:    PUSHAB   TEMP_DESC+4
             10    AE            52   D0 0059A         MOVL     R2, T6(SP)
                         10      AE   9F 0059E         PUSHAB   16(SP)
      00000000G    00            02   FB 005A1         CALLS    #2, LIB$GET_VM
                   09            50   E8 005A8         BLBS     RETURN_STATUS, 97$
                   50 00000000G  8F   D0 005AB         MOVL     #STR$_INSVIRMEM, RETURN_STATUS
                   04            11      005B2         BRB      98$
             20    AE            52   B0 005B4 97$:    MOVW     R2, TEMP_DESC
             08    AE            50   D0 005B8 98$:    MOVL     RETURN_STATUS, RETURN_STATUS
                   03    08      AE   E8 005BC         BLBS     RETURN_STATUS, 99$                     ; 1958
                         0091    31      005C0         BRW      107$
                   58    24      AE   D0 005C3 99$:    MOVL     TEMP_DESC+4, R8                        ; 1961
                   53            58   D0 005C7         MOVL     R8, CHR_PTR
                   57            6C   9A 005CA         MOVZBL   (AP), R7                               ; 1965
                   59            01   D0 005CD         MOVL     #1, ARG_NO
                                 20   11 005D0         BRB      103$
                   50          6C49   D0 005D2 100$:   MOVL     (AP)[ARG_NO], SRC_DESC                 ; 1978
                   02    03      A0   91 005D6         CMPB     3(SRC_DESC), #2                        ; 1988
                                 09   1A 005DA         BGTRU    101$
                   52            60   3C 005DC         MOVZWL   (SRC_DESC), IN_LEN
                   51    04      A0   D0 005DF         MOVL     4(SRC_DESC), IN_ADDR
                                 09   11 005E3         BRB      102$
               00000000G         00   16 005E5 101$:   JSB      STR$ANALYZE_SDESC_R1
                   52            50   D0 005EB         MOVL     R0, R2
          63       61            52   28 005EE 102$:   MOVC3    IN_LEN, (IN_ADDR), (CHR_PTR)           ; 1990
          DC       59            57   F3 005F2 103$:   AOBLEQ   R7, ARG_NO, 100$                       ; 1965
                   50    04      BC   3C 005F6         MOVZWL   @DEST_DESC, R0                         ; 2000
                   56            50   D1 005FA         CMPL     R0, TOTAL_LENGTH
                                 03   15 005FD         BLEQ     104$
                   50            56   D0 005FF         MOVL     TOTAL_LENGTH, R0
   00     BE       68            50   28 00602 104$:   MOVC3    R0, (R8), @OUT_ADDR                    ; 2002
                   50 00000000G  8F   D0 00607         MOVL     #STR$_NORMAL, RETURN_STATUS            ; 2004
                                 58   D5 0060E         TSTL     R8
                                 3E   13 00610         BEQL     106$
         00F0      8F    20      AE   B1 00612         CMPW     TEMP_DESC, #240
                                 1A   1A 00618         BGTRU    105$
                   51            58   D0 0061A         MOVL     R8, STRING_BLOCK
                   51    FE      A1   3C 0061D         MOVZWL   -2(STRING_BLOCK), ALLOC_LENGTH
                                 51   D7 00621         DECL     R1
                   51            07   8A 00623         BICB2    #7, R1
                   51 00000000G0041   9E 00626         MOVAB    STR$$Q_SHORT_Q[R1], INSQUE_ADDR
             00    B1            68   0E 0062E         INSQUE   (R8), @0(INSQUE_ADDR)
                                 1C   11 00632         BRB      106$
                         24      AE   9F 00634 105$:   PUSHAB   TEMP_DESC+4
             10    AE    24      AE   3C 00637         MOVZWL   TEMP_DESC, 16(SP)
                         10      AE   9F 0063C         PUSHAB   16(SP)
      00000000G    00            02   FB 0063F         CALLS    #2, LIB$FREE_VM
                   07            50   E8 00646         BLBS     RETURN_STATUS, 106$
                   50 00000000G  8F   D0 00649         MOVL     #STR$_FATINTERR, RETURN_STATUS
             08    AE            50   D0 00650 106$:   MOVL     RETURN_STATUS, RETURN_STATUS
                   50    04      BC   3C 00654 107$:   MOVZWL   @DEST_DESC, R0                         ; 2013
                   56            50   D1 00658         CMPL     R0, TOTAL_LENGTH
                                 03   15 0065B         BLEQ     108$
                   50            56   D0 0065D         MOVL     TOTAL_LENGTH, R0
                   5A            50   D0 00660 108$:   MOVL     R0, RESULT_LENGTH                      ; 2012
                                 4A   11 00663         BRB      115$                                   ; 1941
```

```
                               53              6E  D0 00665 109$:  MOVL    OUT_ADDR, CHR_PTR                       ; 2031
                               57              02  7D 00668        MOVQ    #2, ARG_NO                              ; 2033
                           04  AE              58  D1 0066B 110$:  CMPL    CHARS_MOVED, OUT_LEN                    ; 2035
                                               3B  13 0066F        BEQL    114$                                    ;
                52         04  AE              58  C3 00671        SUBL3   CHARS_MOVED, OUT_LEN, CHARS_LEFT        ; 2049
57              6C             08              00  ED 00676        CMPZV   #0, #8, (AP), ARG_NO                    ; 2051
                                               2F  19 0067B        BLSS    114$                                    ;
                               50         6C47     D0 0067D        MOVL    (AP)[ARG_NO], SRC_DESC                  ; 2074
                               02         03   A0  91 00681        CMPB    3(SRC_DESC), #2                         ; 2083
                                               09  1A 00685        BGTRU   111$                                    ;
                               59              60  3C 00687        MOVZWL  (SRC_DESC), IN_LEN                      ;
                               51         04   A0  D0 0068A        MOVL    4(SRC_DESC), IN_ADDR                    ;
                                               09  11 0068E        BRB     112$                                    ;
                                   00000000G   00  16 00690 111$:  JSB     STR$ANALYZE_SDESC_R1                    ;
                               59              50  D0 00696        MOVL    R0, R9                                  ;
                               52              59  D1 00699 112$:  CMPL    R9, CHARS_LEFT                          ; 2085
                                               03  15 0069C        BLEQ    113$                                    ;
                               59              52  D0 0069E        MOVL    CHARS_LEFT, R9                          ;
                63             61              59  28 006A1 113$:  MOVC3   R9, (IN_ADDR), (CHR_PTR)                ; 2086
                               58              59  C0 006A5        ADDL2   R9, CHARS_MOVED                         ; 2089
                                               57  D6 006A8        INCL    ARG_NO                                  ; 2091
                                               BF  11 006AA        BRB     110$                                    ; 2035
                               5A              58  D0 006AC 114$:  MOVL    CHARS_MOVED, RESULT_LENGTH              ; 2100
                               50         04   AC  D0 006AF 115$:  MOVL    DEST_DESC, R0                           ; 2108
                           04  B0              5A  B0 006B3        MOVW    RESULT_LENGTH, @4(R0)                   ;
                               12         08   AE  E8 006B7 116$:  BLBS    RETURN_STATUS, 117$                     ; 2124
04        08    AE             03              00  ED 006BB        CMPZV   #0, #3, RETURN_STATUS, #4               ;
                                               0A  12 006C1        BNEQ    117$                                    ;
                                          08   AE  DD 006C3        PUSHL   RETURN_STATUS                           ;
                    00000000G  00              01  FB 006C6        CALLS   #1, LIB$STOP                            ;
                               02         10   AE  D1 006CD 117$:  CMPL    RESULT_CLASS, #2                        ; 2126
                                               1A  12 006D1        BNEQ    119$                                    ;
                               56              5A  D1 006D3        CMPL    RESULT_LENGTH, TOTAL_LENGTH             ; 2130
                                               0D  13 006D6        BEQL    118$                                    ;
                                   00000000G   8F  DD 006D8        PUSHL   #STR$_STRTOOLON                         ; 2131
                    00000000G  00              01  FB 006DE        CALLS   #1, LIB$STOP                            ;
                               50  00000000G   8F  D0 006E5 118$:  MOVL    #STR$_NORMAL, R0                        ; 2141
                                                   04 006EC        RET                                             ;
                               56              5A  D1 006ED 119$:  CMPL    RESULT_LENGTH, TOTAL_LENGTH             ;
                                               04  19 006F0        BLSS    120$                                    ;
                               50              01  D0 006F2        MOVL    #1, R0                                  ;
                                                   04 006F5        RET                                             ;
                               50  00000000G   8F  D0 006F6 120$:  MOVL    #STR$_TRU, R0                           ;
                                                   04 006FD        RET                                             ; 2147

; Routine Size:  1790 bytes,    Routine Base:  _STR$CODE + 000C


;  963          2148  1
;  964          2149  1 END                                             !End of module STR$CONCAT
;  965          2150  1
;  966          2151  0 ELUDOM
;                                        PSECT SUMMARY
;
;       Name                         Bytes                        Attributes
;
;  _STR$CODE                             1802  NOVEC,NOWRT,  RD ,  EXE,  SHR,  LCL,  REL,  CON,  PIC,ALIGN(2)




;                               Library Statistics
;
;                                                -------- Symbols --------        Pages         Processing
;       File                                     Total    Loaded    Percent       Mapped        Time
;
;  _$255$DUA28:[SYSLIB]STARLET.L32;1              9776       17          0          581           00:00.8





;                                        COMMAND QUALIFIERS
;
;       BLISS/CHECK=(FIELD,INITIAL,OPTIMIZE)/NOTRACE/LIS=LIS$:STRCONCAT/OBJ=OBJ$:STRCONCAT MSRC$:STRCONCAT/UPDATE=(ENH$:STRCONCAT
;       )

; Size:          1790 code + 12 data bytes
; Run Time:         00:26.6
; Elapsed Time:     01:45.7
; Lines/CPU Min:     4851
; Lexemes/CPU-Min: 26449
; Memory Used:  478 pages
; Compilation Complete
```

0214 AH-BT13A-SE DIGITAL EQUIPMENT CORPORATION
VAX/VMS V4.0 CONFIDENTIAL AND PROPRIETARY



STRDUPLCH
LIS

STRCOMPAR
LIS

STRFINDSB
LIS

STRMATCH
LIS

STRMSG
LIS

STRLENEXT
LIS

STRCOPY
LIS

STRFINDFI
LIS

STRLEFT
LIS

STRMULTI
LIS

STRCOMEQL
LIS

STRCONCAT
LIS

STRMOVQ
LIS

STRGETFRE
LIS